Republic of Yemen

Ministry of Higher Education & Scientific Research

21 SEPTEMBER UNIVERSITY of MEDICALS & APPLIEED

SCIENCES

Faculty of Laboratory Medicine.

Department of Biochemistry and Molecular biology
Course Specification of Analytical Biochemistry II
Course No. (03.11.317)
2022/2023

Prepared by:	Reviewed by:	Head of the Department:	Vice Dean for Quality affairs	Dean of College:
Dr\ Nawal Al- Henhena	Dr. Nabil Alowiri	DrNawal Al- Henhena	Dr\Gamil Taher Abdul Mughni	- Associate Prof. Dr. Ebtesam Al-Zabedi

I. Course Identification and General Information:

1	**Course Title:**	Analytical Biochemistry II			
2	**Course Code & Number:**	03.11.317			
3	**Credit Hours:**	**Theory Hours**			
		Lecture	**Exercise**	Practical	**Credit Hours**
		2	0	2	3
4	**Study Level/ Semester at which this Course is offered:**	1st Level / 2nd Semester			
5	**Pre –Requisite (if any):**	None			
6	**Co –Requisite (if any):**	None			
7	**Program (s) in which the Course is Offered:**	Master Degree Biochemistry and Molecular biology			
8	**Language of Teaching the Course:**	English			
9	**Study System:**	Semester			
10	**Mode of Delivery:**	Regular			
11	**Location of Teaching the Course:**	University Campus			
12	**Prepared by:**				
13	**Date of Approval:**	2023			

II. Course Description:

Course Description: This course is an advanced study of the principles and techniques used to analyze biological molecules. Topics covered include: Chromatography, Spectroscopy, Mass spectrometry, Immunoassays, and Biosensors.

III. Alignment Course Intended Learning Outcomes with program outcomes

	III. Course Intended Learning Outcomes (CILOs)	Referenced PILOs
A. Knowledge and Understanding: ***Upon successful completion of the course, students will be able to:***		
a1	**Understanding** of instruments techniques and principles of chromatography, electrophoresis, mass spectrometry, nuclear magnetic resonance spectroscopy, biosensors, and imaging techniques	**A1**
B. Intellectual Skills: ***Upon successful completion of the course, students will be able to:***		
b1	**Interpret** analytical data	**B1**
C. Professional and Practical Skills: ***Upon successful completion of the course, students will be able to:***		
c1	**Perform** a wide variety of biochemical an molecular techniques	**C1**
D. Transferable Skills: ***Upon successful completion of the course, students will be able to:***		
d1	**Communicate** scientific concepts and findings effectively in written and oral formats	

IV. Alignment Course Intended Learning Outcomes with Teaching Strategies and Assessment methods:

(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:

	Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
a1	**Understanding** of instruments techniques and principles of chromatography, electrophoresis, mass spectrometry, nuclear magnetic resonance spectroscopy, biosensors, and imaging techniques	Lectures	exam

(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:

	Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1	**Interpret** analytical data	Lectures Laboratory practical	Exam

C Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:

	Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
c1	**Perform** a wide variety of biochemical an molecular techniques	Lectures Laboratory practical	Exam Lectures Laboratory practical

(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:

	Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
d1	**Communicate** scientific concepts and findings effectively in written and oral formats		

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NO.	Units/Topics List	Sub Topics List	Number of Weeks	contact hours	Learning Outcomes (CILOs)
1	**Electrophoretic techniques**	General principle, factors affecting electrophoresis, (electrical field, sample, buffer, sampling medium), low voltage (paper, cellulose acetate, thin-layer electrophoresis), high voltage (gel, SDS, isoelectric focusing, preparative electrophoresis), detection, recovery, estimation	3	**6**	a1,b1,c1,d1
2	**Spectroscopic techniques**	General principle, Types of spectra and their biochemical usefulness, UV spectra, Infra-red, spectrofluorimetry, Luminometry, Atomic and flame spectrophotometry, Electron spin resonance spectrometry, NMR, Mass spectroscopy	3	**6**	a1,b1,c1,d1
3	**Radioisotope Techniques**	The nature of radioactivity , types of radioactive decay, rate of radioactive decay interaction of radioactivity with matter, detection and measurement of radioactivity (based upon gas ionization, based upon excitation), types of scintillation counting, advantages & disadvantages of scintillation counting, determination of counting efficiency applications of radioisotopes in the biological sciences, analytical applications, Safety aspects of the use of radioisotopes.	3	**6**	a1,b1,c1,d1
4	**Electrochemical techniques**	The range of electrochemical techniques, reference electrodes, measurement of pH by glass electrodes, ion-selective electrodes and gas sensors, oxidation-reduction potentials, the oxygen electrode, biosensors, electrochemical detectors.	3	**6**	a1,b1,c1,d1
5	**Cell culture techniques**	Advantages of cell culture, primary culture cells Vs. cell lines, types of established cell lines, requirements and type of cell culture media, assessing cell cultures, sub-culturing cells.	3	**6**	a1,b1,c1,d1
5	**final exam**		**1**	**2**	**a1,b1,c1,d1**
Number of Weeks /and Units Per Semester			**16**	**32**	

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V. Teaching Strategies of the Course:	
1-	Lectures
2-	Seminars

VI. Assessment Methods of the Course:	
No	**Assignment**
1	**Written Exams (Essays) and Quizzes**
2	Structured Oral Exams
4	Objective Structured Practical Exams (OSPE)
5	Student presentation
6	Case study analysis

VII. Assignments:

No.	Assignments	Week Due	Mark	Proportion of Final Assessment	Aligned CILOs (symbols)
2	**Activity**	Throughout the semester	20	20%	a1,b1,c1,d1
5	**Final Exam**		80	80%	a1,b1,c1,d1
Total			**100**		

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Learning Resources:
• *Written in the following order: (Author - Year of publication – Title – Edition – Place of publication – Publisher).*
1- Required Textbook(s) (maximum two).
Handbook of Christen Medical Association, India (CMAI) Medical Laboratory Technology-Robert H. Carman. 2nd Edn. CMAI, New Delhi
2- Essential References.
• Text book of Medical Laboratory Technology, P.B. Godkar 2nd Edn. Bhalani Publication. • Handbook of Biochemistry by M. A. Siddique 8th Edn. Vijay Bhagat Scientific Book
Wep
1. Ebook link- https://www.cartercenter.org/resources/pdfs/health/ephti/library/lecture_notes/health_science_students/medicalbiochemistry.pdf
2. Ebook link- https://books.google.co.in/books?id=Je_pJfb2r0cC&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false
3. Ebook link- https://books.google.co.in/books?id=csPcDAAAQBAJ&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false
4. Ebook link- https://books.google.co.in/books?id=2FkXAwAAQBAJ&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false

XI. *Course Policies:*	
1	**Class Attendance:** Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	**Tardiness:** -If the student dose not attend for more than 6 times, the student will be obligated to withdrew from the course
3	**Exam Attendance/Punctuality:** No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	**Assignments & Projects:** Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	**Cheating:** Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	**Forgery and Impersonation:** Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	**Other policies:** The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration